

**Pollution Prevention
Assessment Guidance**

Draft

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Background

The Department of Energy has established pollution prevention as a priority and as an integral part of its environmental and business strategies. To demonstrate the importance of waste minimization/pollution prevention, the Secretary of Energy directed that a DOE crosscut plan for waste minimization be prepared. This plan responds to the DOE's goals of achieving greater energy security, increasing energy and economic efficiency, and enhancing environmental quality.

The Waste Minimization/Pollution Prevention Crosscut Plan, revised in early 1994, establishes a Department-wide goal to reduce the total releases of toxic chemicals to the environment by 50 percent by 1999 and requires each DOE site to establish site-specific goals to reduce generation of hazardous, radioactive, mixed, and sanitary wastes and pollutants. In addition, each DOE organization that generates pollutants or manages waste is expected to develop an integrated and comprehensive waste minimization and pollution prevention program.

To assist in the assessment of DOE's pollution prevention programs, the following protocol has been developed. In this regard, the protocol has been specifically designed to provide guidance to the Assessment Teams. The protocol, though, also serves another purpose, that of providing guidance and insight on pollution prevention programs which can be utilized by the DOE operations and field offices in conducting their own internal evaluations. Further, the protocol can be used by line organizations as a tool for establishing and enhancing pollution prevention programs in their own organizations. Recognizing the differences among DOE facilities and programs, the protocol does not attempt to be comprehensive for every site and situation, but rather serves as a general guide for evaluating comprehensive pollution prevention programs. Therefore, it is constructed with generic language to provide flexibility in its application to various types of DOE and DOE contractor programs, offices, facilities, and activities.

Purpose

The primary purpose of a DOE pollution prevention assessment is to provide the Secretary of Energy, through the Assistant Secretary for Environment, Safety and Health, concise information pertaining to:

- Strengths and weaknesses of pollution prevention programs and activities within DOE organizations.
- Adherence with Best Management Practices pertaining to pollution prevention programs and activities.
- Compliance with DOE Orders and policies which address pollution prevention programs and activities.
- Noteworthy pollution prevention practices.

These assessments are also intended to provide DOE organizations and contractors with feedback on the effectiveness of their pollution prevention programs and activities and to identify opportunities for improvement.

Scope

The scope of a pollution prevention assessment is organized into three parts: the first addresses strategic direction which establishes the intent and breadth of the program; the second addresses the program infrastructure or the key management systems required for an effective program; the third part addresses the implementation mechanism and is based on a logical step-by-step process of carrying out pollution prevention projects. Within each part are sections that address the various elements of comprehensive and effective pollution prevention programs and activities. These include the following:

- Policy
- Definitions
- Goals and Objectives
- Management Commitment
- Plans
- Organization
- Resources
- Employee Motivation
- Communications
- Information Management
- Related Programs
- Program Evaluation and Reporting
- Existing Facility Operations
- Integration with Support Activities

Each section comprises specific criteria statements that characterize comprehensive and effective pollution prevention programs and activities. The lines of inquiry delineated under each criterion are intended to provide guidance to the assessor in evaluating that criterion; they are not intended to be subcriteria. It is important to note that the criteria are not all inclusive nor prescriptive. They are designed only to provide overall direction and to encourage a line of inquiry for the assessor. Additional lines of inquiry may be appropriate depending on the specific organization being reviewed and the scope of the pollution prevention program.

Approach

The protocol is based on a combined approach consisting of an assessment of management systems supporting the program and a technical assessment of program implementation. The responsibility of the assessor is to review the management systems to determine whether they have sufficient structure and formality to assure that pollution prevention activities are conducted in a manner that is consistent with DOE policy and requirements. In addition, the assessor is to review and inspect the actual pollution prevention activities in order to understand the effectiveness of project implementation.

The assessment is based on a combination of staff interviews, document reviews, and site inspection. Interviews are exceptionally important. They provide the primary means of understanding the organizational relationships, roles and responsibilities, policies, and systems that form the framework for implementing pollution prevention projects. More importantly, they often reveal differences in the actual versus the documented practices. Document review is required to verify the formality of the systems and confirm interview information. Site

inspection with a focus on specific projects is critical in understanding the depth, breadth, and effectiveness of the pollution prevention program.

I. Strategic Direction

A. Policy

In this section, the organization's policy for pollution prevention will be reviewed. An effective program requires a written policy statement that defines the organization's degree of commitment to pollution prevention. The policy should clearly articulate the scope and relevance of pollution prevention within the context of overall environmental management; and, it should be well communicated throughout the organization.

1. The organization has a written pollution prevention policy that is consistent with Headquarters and CSO policy.
 - a. Identify which department issued the policy. Determine whether this department has sufficient stature/authority within the organization for the policy to be taken seriously. If more than one department has issued pollution prevention policy, determine why this is so (e.g., department-specific version of site-wide policy versus unclear responsibility, etc.) and whether the policies are consistent.
 - b. Determine if the policy is signed and dated by an appropriate member of the senior management team (e.g., signed by overall head or head of department with pollution prevention responsibility), and whether the policy is current with respect to latest executive orders or DOE directives.
 - c. Determine whether the policy addresses all types of waste (hazardous, radioactive, mixed, sanitary, etc.) and releases to all media (air, water, soil).
 - d. Assess whether the organization's pollution prevention policy is also an integral part of the current environmental compliance policy.
 - e. Based on your knowledge of pollution prevention policies in other organizations, assess the quality of this policy (e.g., defined, realistic and measurable goals, endorsed by senior management, etc.).

2. The organization has a clear definition of pollution prevention that is consistent with Headquarters and CSO definitions and that is widely understood across the organization.
 - a. Determine whether the policy provides a clear-cut definition of pollution prevention and, if so, whether it is consistent with that in the Crosscut Plan.
 - b. Determine whether the organization differentiates between pollution prevention and waste minimization. If so, document the different definitions.
 - c. Determine whether the policy describes and adopts a hierarchy of waste reduction practices (source reduction, reuse, etc.) either explicitly or implicitly.
 - d. Assess the extent to which the definition and attendant scope of pollution prevention is understood and accepted throughout the organization.

B. Strategic Plan

This section focuses on the organization's overall strategic plan comprised of clearly defined goals and objectives that relate not only to waste reduction in general, but specifically to pollution prevention. To the extent possible, these should be both quantifiable and also somewhat flexible so as not to overly constrain decision making.

3. The organization has clearly defined pollution prevention objectives and has identified a strategy to achieve them.
 - a. Determine whether pollution prevention program objectives are clearly stated in a pollution prevention plan, and whether they are specific enough to be capable of accomplishment and measurement.
 - b. Assess whether a strategy for achieving the pollution prevention objectives is described in the plan, and whether there are site directives or guidance which provide additional instruction for plan implementation.

- c. Determine whether these objectives and plans for achieving them have been distributed/communicated to employees and contractors, and document how this has been done.
 - d. Determine whether pollution prevention is integrated with other planning activities (short-term, long-term, strategic) and who represents pollution prevention issues in key strategic and operations planning meetings and committees.
 - e. Determine how the organization balances longer-term activities, such as pollution prevention, with short-term needs; assess whether this concept has been addressed.
4. The organization has established specific, measurable pollution prevention goals and milestones.
- a. Determine what pollution prevention goals have been established and how they were developed (e.g., based on historical results, demonstrated technology). Identify whether process waste assessments (PWAs) were used to establish the goals.
 - b. Identify what guidance was used to establish the goals (e.g., guidance from HQ, CSO, Operations Office). Identify also whether the goals were prescribed from higher levels of management within DOE (e.g., HQ, CSO, Operations Office).
 - c. Document those goals that are inconsistent with Department-wide goals, other DOE requirements, Executive Order 12856, and applicable state requirements. Compare to the goals from the Waste Minimization/Pollution Prevention Crosscut Plan listed below:

"Reduce total releases of toxic chemicals to the environment, and off-site transfers of such chemicals for treatment and disposal across the DOE complex, by 50 percent by 12/31/99."

"Establish site-specific goals achievable by 12/31/99 to reduce the generation of all types of waste and pollutants, including hazardous, radioactive, radioactive mixed, and sanitary from site operations."

- d. Determine whether the goals address all emissions and effluents or only hazardous waste. Identify what media are addressed. If any media were excluded, determine why.
- e. Determine whether the goals are specific, quantitative, assignable, realistic, and time-oriented. Determine also whether the goals address volume or toxicity reduction, or both and how the goals are expressed (e.g., percentage, volume, mass).
- f. Determine whether criteria have been developed to measure progress against the goals.

C. Top Management Commitment

This last section of Strategic Direction focuses on the degree to which top management demonstrates its commitment to pollution prevention. Strong and visible senior management support is necessary to ensure that the culture of pollution prevention is adopted throughout the organization. This must be communicated through clearly defined expectations, establishing accountability, assigning resources and monitoring initiatives and performance.

- 5. Senior management clearly communicates its commitment to pollution prevention (through the issuance of formal statements and policies) and demonstrates its support of the program and projects (through resource allocation, assignment of responsibility, and systems of accountability).
 - a. Assess how senior management has demonstrated its commitment to pollution prevention (e.g., formal statements, issuance of pollution prevention policy, incentive and award programs, etc.).
 - b. Determine whether top management support is demonstrated through pollution prevention/waste minimization funding (specific budget item, overhead, personnel allocation).

- c. Determine to what extent senior managers get involved in the pollution prevention program and activities. Identify examples of personal involvement.
 - d. Determine whether senior management has formally assigned responsibility and accountability for the pollution prevention program. Document the highest level of management with pollution prevention-based performance standards incorporated into their personal performance review.
 - e. Identify the highest level of management at which pollution prevention initiatives and performance are routinely discussed in staff meetings.
 - f. Identify whether there is a difference between senior level and middle management support. If so, explain.
6. Senior management has demonstrated its commitment to pollution prevention extending accountability to site contractors.
- a. Determine the highest level of site office/contractor review meetings in which pollution prevention initiatives and performance are regularly discussed (e.g., monthly, quarterly, annually).
 - b. Review the criteria for the contractors' performance and award fee to determine if the accomplishment of pollution prevention goals and milestones is included. Assess the magnitude and "impact" of any award fees.

II. Program Infrastructure

A. Program Plans

The focus of this section will be to evaluate the framework for the pollution prevention program. This framework should entail a comprehensive plan or set of plans that establishes the overall structure and clearly addresses implementation requirements. Such plans should also be congruent with Headquarters and CSO guidance.

7. The organization has a comprehensive pollution prevention plan that is consistent with Headquarters and CSO plans and requirements.
 - a. Establish that a comprehensive plan exists.
 - b. Assess the linkages between the organization's plan and Headquarters, CSO, and the Operations Office.
 - c. Based on a review of Appendix A, Pollution Prevention-Related Requirements and Documents, as well as of state and local requirements, assess the extent to which the plan addresses applicable regulatory and legal requirements (e.g., generally meets most requirements, does not address majority of requirements).
 - d. Determine whether the site has a requirement for division-specific plans. If so, review a sample of these plans for consistency with the site plan.
 - e. Determine who was involved in the development of the plan; whether it included input from various divisions or staff functions; and, specifically, which ones.
 - f. Identify when the plan was developed/issued and when it is scheduled to be updated. Determine how frequently the plan will be reviewed and revised.
 - g. Identify to whom the plan was distributed (i.e., what divisions, departments, level of individuals).

8. The plan provides a clear outline of the site's approach to pollution prevention
 - a. Document whether the pollution prevention plan describes the pollution prevention program organization structure and includes an organizational chart.
 - b. Assess whether the plan contains a definitive schedule for implementation of the pollution prevention program and attainment of milestones.
 - c. Determine whether the plan addresses site contractors' responsibilities for developing pollution prevention programs. Review contractor's programs and plans and determine whether they are consistent with the site's plan.

B. Organization

This section addresses the organization established to plan, coordinate and implement the pollution prevention program. It is crucial that roles, responsibilities, and accountabilities for pollution prevention activities be clearly defined and understood; and, that appropriate authority has been delegated. In addition, a mechanism for disseminating information and identifying pollution prevention opportunities should be established.

9. The pollution prevention program is coordinated by an individual or group who have sufficient authority and clearly recognized roles, responsibilities, and accountabilities.
 - a. Determine how the organization's pollution prevention program is coordinated (e.g., by one individual, task force). If a team is responsible, identify who and what functional areas they represent. Assess whether generator organizations are represented.
 - b. Determine whether a site pollution prevention champion/coordinator has been appointed. Note the organization this person represents (e.g., waste generating organization, waste management organization, senior site management).

- c. Assess the pollution prevention champion's responsibilities and whether these responsibilities are documented. Determine if this person has other responsibilities that may take priority over or conflict with pollution prevention. Assess whether his/her pollution prevention role is widely recognized and understood.
 - d. Identify who else has responsibility for various program activities (e.g., setting goals, conducting PWAs, measuring project results, evaluating pollution prevention progress, reporting to management). Determine if the pollution prevention roles and responsibilities for these individuals are documented. Assess whether these pollution prevention roles and responsibilities are widely recognized and understood.
 - e. Determine whether pollution prevention responsibilities are assigned high enough in the organization so that the parties responsible have sufficient authority to carry out their pollution prevention duties.
 - f. Determine whether the waste management group has any responsibility to facilitate or mandate implementation by waste generators. Determine whether waste generators had input into the development of the pollution prevention program.
 - g. Determine whether pollution prevention aspects of individual job responsibilities are included in job descriptions and performance standards used in the performance appraisal process.
10. The organization has a cross-functional pollution prevention committee that assists in the dissemination of pollution prevention information and in identifying pollution prevention opportunities.
- a. Identify the committee's charter, objectives, and authority with respect to the pollution prevention program. Determine whether the committee makes recommendations for pollution prevention projects.
 - b. Assess how the committee interacts with waste generators, waste management staff, senior contractor and DOE program staff.

- c. Based on interviews with committee members and waste generators, assess how effective the committee is in its role. If it is considered ineffective, identify the gaps or barriers to its usefulness (e.g., technical knowledge and commitment of the members, heavily focused on administrative issues, etc.).

C. Resources

In this section of the assessment, the Assessment Team will determine how the pollution prevention program and activities are funded and whether the level of funding is appropriate to meet the organization's goals. In addition, pollution prevention staffing resources will be evaluated to ensure that the human resources available for pollution prevention activities are adequate to properly address the organization's pollution prevention goals.

11. Pollution prevention projects are considered in annual budgeting processes and given an appropriate level of funding in order to meet program goals.
 - a. Review Activity Data Sheets (ADS), Five Year Plans, A-106 reports. Obtain an overview of the capital and operating budgeting processes, including roles, responsibilities, and annual timing.
 - b. For the budget categories which focus on pollution prevention, identify the lead person responsible and determine how the budget estimate was made. Identify what type of costs are included (e.g., characterization, handling, packaging, treatment, disposal, etc.) and which costs are not included. Determine whether budgets are established *a priori*, or in light of known project development work.
 - c. Determine whether there are established ranking systems for project approval throughout the capital and operating budget processes. Determine what priority is assigned to environmental projects vs. production or other activities.

- d. Determine whether pollution prevention projects only compete with environmental projects or against all other site projects. Investigate under what criteria pollution prevention projects compete with other projects for capital funding (e.g., return on investment, EHS priority, etc.).
 - e. Using past and current budgets, assess why the approved projects were funded and why rejected projects were denied funding. Determine if these projects are subjected to life cycle analyses, and, if so, whether waste minimization, pollution prevention, and energy efficiency are considered in such analyses.
 - f. Determine if there are special funds or sources dedicated to pollution prevention. Identify the relative contribution of pollution prevention funding from all sources (CSOs, contractors, etc.).
 - g. Determine if the organization has a line-item budget for its pollution prevention program. If so, determine whether the budget has increased/decreased over the last budgeting cycle. Identify whether the line-item budget has specific allocations for PWAs, tracking systems, process modifications, staff, QA, R&D, program implementation, etc.
 - h. Determine if line items are expressed in dollar amounts or as a percentage of the total facility budget for that activity (e.g., waste minimization training as a percentage of total training budget).
 - i. Determine whether departments and managers are informed of their waste management costs and savings. Assess whether they are charged for the waste management costs they generate or if they accrue the savings.
12. The organization has identified and allocated adequate human resources in order to achieve the goals of the pollution prevention program.
- a. Determine whether the budget or other planning documents indicate how many full-time equivalents are assigned to pollution prevention. If yes, review how the number was calculated. Identify how many personnel were selected and for what roles.

- b. Identify other staff who are related to pollution prevention activities (secondarily or peripherally).
 - c. Assess whether the staffing levels are adequate to meet the organization's goals and objectives. If not, document the gap between what is available and your perception of what is required.
13. Personnel with pollution prevention responsibilities have the relevant background and training to carry out their responsibilities.
- a. Review the backgrounds and experience of the personnel with pollution prevention responsibilities. Assess how well they relate to their pollution prevention responsibilities. Interview selected personnel and inquire as to how they perceive their capabilities/experience relative to their pollution prevention responsibilities.
 - b. Determine whether staffs' pollution prevention responsibilities are appropriate given their other responsibilities.
 - c. Determine whether the organization has a pollution prevention awareness orientation/training program, and, if so, identify what groups receive this training. Document the types of pollution prevention training received by personnel (e.g., formal classroom, on-the-job, attendance at conferences).
 - d. Determine how pollution prevention training needs are identified and addressed by the organization (e.g., as part of an existing training program that conducts needs assessment, recordkeeping, tracking, etc.).
 - e. Determine whether pollution prevention concepts and assignments are incorporated as part of executive management training.
 - f. Determine whether the organization assesses the effectiveness of pollution prevention training.

D. Employee Motivation and Awareness

This section of the assessment focuses on the effectiveness of the organization's systems to incorporate pollution prevention as part of its culture. The Assessment Team will evaluate the level of pollution prevention awareness throughout the organization as well as the training provided to personnel with pollution prevention responsibilities. In addition, the incentives to personnel to encourage change will be assessed.

14. The organization promotes its commitment to pollution prevention and has achieved a high level of awareness throughout the site.
 - a. If the organization has developed a pollution prevention awareness plan, review the plan to identify what groups are included (e.g., managers, all employees, contractors, etc.), and assess whether it is consistent with HQ policy and requirements.
 - b. Determine whether the site's pollution prevention awareness plan is included as part of the waste minimization plan or if it is a separate plan. Identify who has received the awareness plan (e.g., all personnel, contractors, generators).
 - c. Note examples of how pollution prevention concepts and awareness are incorporated into facility culture and job ethic (e.g., incorporated in day-to-day activities, routinely communicated to all staff, etc.).
 - d. From interviews conducted by the Assessment Team, characterize the overall pollution prevention awareness at the facility.
15. Pollution prevention activities are encouraged through incentives and award programs.
 - a. Determine how the organization encourages individual and collective pollution prevention initiatives. Identify any programs that recognize and reward contributions to achieving pollution prevention goals, and determine how such programs are communicated.

- b. Document any innovative incentives (such as the use of monetary savings to effect further reductions) that promote cost-effective pollution prevention practices.
- c. Identify whether there is a system for soliciting and following-up on employee pollution prevention suggestions.

E. Communications

The focus of this section involves an evaluation of communications systems. The effectiveness of communications mechanisms will be determined through an evaluation of the awareness of the pollution prevention policy and program, the efficacy of information dissemination, and the understanding of roles and responsibilities throughout the organization. Effective communications systems will also address sharing information with other DOE and government entities as well as industry and academia.

16. Pollution prevention information is effectively disseminated throughout the organization.
 - a. Note examples of how the organization communicates its pollution prevention hierarchy to staff, and identify the mechanisms used to share pollution prevention information across the site (e.g., signs, newsletters, dedicated bulletin boards, seminars, meetings).
 - b. Assess whether pollution prevention information is adequately communicated between the site and Headquarters, CSO, and Operations Office by interviewing Headquarters, CSO, and Operations Office staff. Identify how the site stays abreast of DOE pollution prevention requirements and approaches (e.g., formal training and guidance, technical assistance, memoranda, HAZWRAP, EPA, or other databases, reports, etc.).
 - c. From interviews conducted by the Team, characterize the effectiveness of internal communication systems to disseminate pollution prevention information.

17. Pollution prevention information is appropriately shared with other DOE and government facilities, industry, academia, and the public.
 - a. Determine whether there is a program or a process for exchange of information with other government agencies, industry, or educational institutions.
 - b. Note any personnel with pollution prevention responsibilities who are involved in industry associations.
 - c. Determine whether the organization communicates pollution prevention success stories to the public; if so, document what media is used and how often this communication occurs.

F. Information Management

In this section, the Assessment Team will evaluate the effectiveness of the organization's systems to manage information. Success in the pollution prevention program cannot be demonstrated unless it can be measured and documented. The systems to track and measure waste generation and costs and savings associated with pollution prevention activities will be assessed.

18. The organization has a consistent and controlled system to manage its pollution prevention data.
 - a. Determine whether guidelines or requirements have been established for calculating or assembling pollution prevention or environmental data. If so, document how they were developed.
 - b. Identify the system used to manage pollution prevention data. Determine whether it is centralized or departmental. Identify who is responsible for it.
 - c. Determine how the organization ensures the quality of its pollution prevention data. Assess the quality control for the data management system.
19. The organization has a system to track all its waste generation throughout the production process to point of discharge or treatment, storage, or disposal.

- a. Determine if the organization has developed baseline data for the generation of each waste type documented in Step I.B. of this protocol.
 - b. Identify who or what group is responsible for the waste tracking system.
 - c. Determine whether the tracking system was designed to facilitate meeting reporting requirements of DOE, EPA, and the states. Determine whether the tracking system is compatible with DOE-wide waste generation tracking to facilitate compatibility of reports.
 - d. Identify who receives the waste tracking reports (e.g., Operations Offices, site management, waste generators).
 - e. If the site generates classified waste, determine how these wastes are tracked for information purposes.
20. The organization has a system to account for actual costs and savings of pollution prevention projects.
- a. Identify how the costs are tracked. Determine if there is a standard system, and if it is integrated with the waste tracking or other systems.
 - b. Determine if the organization accounts for pollution prevention costs in integrated projects (i.e., where pollution prevention is incorporated within other projects). Identify how costs and savings are assigned.
 - c. Determine if the organization has identified cost savings and the method used to calculate the savings. Determine how savings are tracked and for how long after the implementation of the project.
 - d. Determine how the organization uses the project cost and savings information (e.g., considered in cost estimations of future projects, proposal, budget planning).
 - e. Determine whether the organization accounts for associated costs (e.g., personnel, recordkeeping, transportation, pollution control equipment, treatment, storage, disposal, liability, compliance, and oversight).

G. Related Programs

This section focuses on the organization's additional programs that include the concepts of pollution prevention. The Assessment Team will determine the scope of other such programs, determine how they are coordinated with the pollution prevention program, and assess their effectiveness at achieving pollution prevention goals.

21. The organization has various related programs as part of its pollution prevention activities.
 - a. Determine what related programs have been formally established, identify who or what department administers the programs, and determine how long they have been in place. Related programs could include:
 - Affirmative Procurement/Inventory Control
 - Materials Exchange and Substitution
 - Toxics Use Reduction
 - 33/50
 - Waste Recycling
 - Ozone-depleting Substance Phase-out
 - Energy Management
 - ALARA
 - NEPA
 - b. Determine the scope of each program with respect to which materials and wastes are included or excluded.
 - c. Identify the successes and failures of each program. For each program, determine if the program is assessed periodically in an effort to improve its effectiveness.
 - d. Determine if there is a schedule for routine and periodic review and revision of each program to ensure that it remains cost-effective.
22. The organization coordinates the various related programs as part of its pollution prevention activities.
 - a. Using lines of specific inquiry, determine the following relative to pollution prevention for the **affirmative procurement/inventory control** program (if it exists):

- 1) Determine if the site has a policy regarding the procurement of hazardous material and what is included (e.g., inventory reduction program, etc.).
 - 2) Determine if the procurement group has a comprehensive inventory control system for toxic materials (e.g., that addresses shelf life of products, samples from salespeople, etc.), and document how long the program has been in place.
 - 3) Assess whether the procurement process includes consideration of toxicity of materials, quantities purchased for identified need, etc. Identify the factors that are considered (e.g., price, toxicity, compatibility with existing materials, disposal costs, shelf life).
- b. Using lines of specific inquiry, determine the following relative to pollution prevention for the **materials exchange and substitution** program (if it exists):
- 1) Review the records and any reports that are kept of the materials exchanged, costs, and savings. Identify who receives the reports (e.g., site managers, waste generators).
 - 2) Determine who the materials exchange and substitution program "champions" are within the organization by interviewing senior level managers. Interview these "champions" to determine whether participation is uniform throughout the organization.
- c. Using lines of specific inquiry, determine the following relative to pollution prevention for the **toxics use reduction** program (if it exists):
- 1) Review the records and any reports that are kept of the toxics reduced, costs, and savings. Identify who receives the reports (e.g., site managers, waste generators).
 - 2) Interview key toxics use reduction program participants to identify linkages with other pollution prevention related programs such as 33/50, materials exchange, etc.

- d. Using lines of specific inquiry, determine the following relative to pollution prevention for the **33/50** program (if it exists):
 - 1) Identify the reduction goals that have been set for the use and release of the 17 chemicals identified in the program.
 - 2) Determine who is responsible for measuring the progress of the organization against the 33/50 program conformance schedule, and assess whether the schedule goals and timetables remain conceivable.
- e. Using lines of specific inquiry, determine the following relative to pollution prevention for the **recycling** program (if it exists):
 - 1) Determine if the recycling program includes administrative and industrial wastes (paper, aluminum cans, toner cartridges, scrap metals, drums, pallets, etc.). Determine what recycling options have been implemented.
 - 2) Review the records and any reports that are kept of the materials recycled, waste avoided, costs, and savings. Identify who receives the reports (e.g., site managers, waste generators).
- f. Using lines of specific inquiry, determine the following relative to pollution prevention for the **ozone-depleting substances** phase-out program (if it exists):
 - 1) Assess whether the goals for phasing out the purchase and use of ozone-depleting substances are consistent with the requirements of the Montreal Protocol and the Clean Air Act Amendments of 1990.
 - 2) Review the records and any reports that are kept of the chemicals phased out, costs, and savings. Identify who receives the reports (e.g., site managers, waste generators).
- g. Using lines of specific inquiry, determine the following relative to pollution prevention for the **energy management** program (if it exists):
 - 1) Determine what areas of conservation are included (lighting, HVAC, computers, equipment). Also, identify some of the major

energy conservation projects for the organization.

- 2) Review the records and any reports that are kept of energy conservation figures, costs, and savings. Identify who receives the reports (e.g., site managers, department managers, etc.).
- h. Using lines of specific inquiry, determine the following relative to pollution prevention for the **ALARA** program (if it exists):
- 1) Determine whether the program ensures that radioactive doses to workers and the public and releases to the environment are as low as reasonably achievable.
 - 2) Review the records and any reports that are kept of this program and its costs. Identify who receives the reports (e.g., site managers, department managers, etc.).
- i. Using lines of specific inquiry, determine the following relative to pollution prevention for the **NEPA** program (if it exists):
- 1) Review project NEPA documentation to assess whether pollution prevention decisions related to NEPA activities are documented, as well as whether new processes and projects are evaluated for pollution prevention opportunities before being implemented.
 - 2) Interview construction and engineering department personnel, if the organization being assessed has these groups, and determine whether they believe they have a role or participate in the NEPA program.

H. Program Evaluation and Reporting

The purpose of this section is to evaluate the systems that assess the effectiveness of the pollution prevention program as well as the reporting activities associated with these systems and with the program.

23. The organization has a system to measure pollution prevention progress against program goals and to utilize the measurement results as a basis for program improvement.

- a. Determine if the organization has a system to measure pollution prevention progress against program goals. Identify how frequently progress is assessed and what success demonstration criteria it is assessed against.
 - b. Determine whether any self-assessments of the pollution prevention program or specific pollution prevention projects have been conducted. If so, review the reports to determine whether obstacles or lessons learned have been identified from the assessments. Review the follow up and any approaches identified to address these issues.
 - c. Assess whether the reports summarizing the measurement results are used to establish future pollution prevention goals and program objectives.
24. Pollution prevention results, and the status of relevant initiatives, are communicated to management and regulators on a routine basis.
- a. Assess how the organization reports pollution prevention results (both progress and setbacks) to management. Identify who develops the reports and who receives them and on what frequency. Review the reports for content (e.g., exception-based, results-based, lessons learned).
 - b. Identify what reporting to regulatory agencies is required (e.g., RCRA waste minimization, TRI). Determine whether the organization has a system to ensure this reporting occurs as required.
 - c. Determine whether there is a schedule for preparation of Form R reports to EPA and the State, including data on source reduction and recycling as well as toxic chemical inventories and releases.
 - d. Determine if there is a schedule for preparation of reports to DOE on:
 - waste generation and waste minimization;
 - progress in meeting goals of the 33/50 program;
 - collection, tracking, and compilation of data on the progress of TRI reporting;
 - effectiveness of and compliance with affirmative procurement programs;
 - efforts and success in phasing out the use of ozone-depleting substances.

III. Implementation Process

A. Existing Facility Operations

This section of the assessment focuses on the actual implementation of pollution prevention within the facility. Both the breadth in application of the program and the process that the organization employs to implement pollution prevention projects will be assessed. The process usually involves a series of steps which typically begins with conduct of waste assessments or inventories followed by identification, evaluation and prioritization of opportunities and, finally, selection and implementation of projects.

25. Waste Assessments/Inventories

Waste assessments/inventories are conducted that are of sufficient scope to quantify and categorize the organization's wastes.

- a. Identify what types of (potential) wastes have been included (e.g., hazardous, radioactive, mixed wastes) and how these wastes are defined. Determine whether there is a definitive list of all the wastes covered.
- b. Determine what media of (potential) releases are considered and to what extent (i.e., air, water, solids).
- c. Identify the scope of onsite waste generating activities covered (e.g., operations/manufacturing, maintenance, construction, administration, remediation). Determine how nonroutine sources are addressed (e.g., tank spills, tank cleanings)
- d. Determine how all of the organization's sources, activities, and process operations that are to be included within the waste assessment are identified. Establish who (or what group) does this and what information sources are used (e.g., existing waste management tracking systems, waste manifests, SARA III reports, permits, process flow diagrams).
- e. Assess how far up the "production chain" the waste analysis goes. Determine whether waste generation upstream of onsite treatment is addressed or just releases/discharges. Determine whether material supplies included as potential sources of future wastes.

- f. Assess how variability and changes in facility operations or activities have been factored into the waste assessment.
- g. Determine if the assessment extends beyond onsite activities. Determine whether offsite disposition of waste is covered (including transportation) and if waste associated with product use and disposition is included.

Appropriate metrics and methodologies are utilized to ensure accuracy of waste assessments.

- h. Determine what methods are used to develop the waste assessment data and whether they are based on existing guidelines (e.g., DOE PWAS Guidance, EPA Waste Minimization Opportunity Assessment Manual).
- i. Determine what mix of data sources are used and why, such as:
 - pre-existing (e.g., manifests, permits, on-line monitoring systems, routine sampling programs, production records, etc.);
 - standardized estimating procedures (e.g., ASTM, AP-40);
 - focused sampling/analysis programs; and,
 - detailed material and energy balances.
- j. Determine how data are validated or cross-checked for consistency and accuracy. Review any efforts underway or implemented to improve accuracy or completeness of data.
- k. Assess how the inventory is organized/compiled in characterizing facility operations and activities, including the type of database system used. Determine whether categorizations are by waste type or specific constituents developed -- radioactive (e.g., high level, low level, TRU, mixed); degree of toxicity or hazard; regulatory categories; etc.

Responsibility for waste assessments is clearly defined and understood.

- l. Identify who or what group(s) is responsible for maintaining and coordinating the waste assessment(s).
- m. Determine how the organizational responsibility for waste assessments is assigned (e.g., by divisions, business organizations, etc.).

- n. Determine how waste assessment teams are selected and whether both line and management organizations are represented. Generally assess the appropriateness of the technical quality of team makeup.

The organization has a system to monitor the status of waste assessments.

- o. Determine how many waste assessments have been conducted. Review the schedule for completing waste assessments.
 - p. Assess how the waste assessment is maintained and whether or not it is routinely updated. Determine if what triggers updates.
 - q. Identify what areas of waste assessments have been targeted for improvement and the basis for selecting these areas.
26. Waste streams have been prioritized based on general DOE policy and guidelines as well as on policy and guidelines established by the organization.

A hierarchy of priorities has been established.

- a. Identify the current priorities and how they are defined. Assess whether specific chemicals or waste types, emission sources, and/or process operations have been identified.
- b. Assess the priority given to costs and whether it is addressed explicitly or implicitly.
- c. Assess how often priorities are reviewed and re-evaluated and what triggers this review. Identify who or what group is responsible.

Priorities have been based upon pre-established criteria.

- d. Identify the criteria used to establish the priorities. Assess whether they relate to specific waste types, waste constituents, quality of waste, waste/constituent impacts, cost of treatment, public awareness, or environmental liability.
- e. Identify who or what group developed the criteria and how the criteria were selected.

- f. Determine how the criteria were applied in developing priorities. Assess whether a ranking system was used such as "gates" (i.e., certain hazard levels and above) or "weights" (i.e., scoring system).

27. Evaluation of Options/Waste Minimization Techniques

A process exists for identifying and developing pollution prevention options consistent with priorities.

- a. Review how options are identified and developed. Identify who or what group(s) are responsible for identifying potential options as well as who or what group(s) are responsible for developing the options.
- b. Assess how technology transfer is integrated into the process. Determine what internal DOE resources/experience are accessed in identifying options as well as what external resources/experience are used.
- c. Assess whether a hierarchy of pollution prevention is considered in identifying options -- such as source reduction (material substitution, process modification, technology upgrade, etc.); followed by internal recycle-reuse; then byproduct conversion; and finally waste treatment/disposal.
- d. Determine if options are prescreened in any way. If so, determine what criteria are used.
- e. Assess to what level of detail options are developed (e.g., design, O&M requirements, costs, residual environmental impacts, etc.) and whether it is project/option specific or consistent across all projects.
- f. Determine how the organization estimates costs of a specific project and whether there is a standard documented procedure.
- g. Determine whether developed options are subjected to independent review. If so, identify by whom or what group.
- h. If certain options require R&D or demonstration, determine how these are addressed.

- i. Determine if research is carried out on a continuing basis regarding particular areas for which acceptable options have yet to be identified or develop.

Standard evaluation factors have been developed to allow consistent comparisons.

- j. Identify the principal technical considerations (e.g., practicality and compatibility; performance; commercial demonstration; reliability/operational flexibility).
- k. Identify the principal economic considerations (e.g., payback; capital investment; incremental return on waste reduction; life cycle analysis).
- l. Identify the principal ESH considerations (e.g., pollution prevention hierarchy; "permitability"; extent of waste reduction; safety/occupational health; secondary environmental impacts).
- m. Identify the principal implementation considerations (e.g., schedule; facility/process downtime; space; system retirement/D&D).
- n. Determine if there are other important factors (e.g., public relations; institutional acceptance barriers; regulatory incentives/disincentives; future uncertainties; fulfillment of regulatory commitment).
- o. Obtain an overview of the evaluation process (a "flow diagram" would be helpful) in order to identify the steps and who or what groups are involved.
- p. Assess how the evaluation factors are balanced in the evaluation process. Identify what criteria are used in ranking or recommending options.
- q. Determine if the process and criteria are the same for different types of waste producing activities (e.g., operations vs. remediation).
- r. Identify what resources are used in developing/preparing options (e.g., site-by-site or coordinated among sites and CSOs).
- s. Assess whether prior DOE or industry experience has been factored into the evaluation and how. Determine how uncertainties and R&D requirements are factored into the evaluation.

28. Pollution prevention options are selected based on sound criteria.
 - a. Determine how final selections are made. Identify who or what group makes the selection decisions.
 - b. Identify the selection criteria. Determine whether they are the same as for conventional projects or for compliance projects. Assess if there is special "value" assigned to pollution prevention projects.
 - c. Determine if selection and decision processes differ for integral pollution prevention projects and stand-alone pollution prevention projects.
 - d. Review how funding decisions are related to the selection process (e.g., selections made based on available funds, selections pre-established, selections made independently of subsequent funding decisions).
 - e. Determine how R&D projects are selected (e.g., a separate budget for the site, coordinated with Headquarters, laboratories, or other sites). Assess how continued funding of specific R&D projects is determined.
29. Implemented projects are evaluated to assess effectiveness.
 - a. For pollution prevention projects that have been implemented, determine if follow-up evaluations are planned to see how effective the options are in reducing pollution.
 - b. Identify how many pollution prevention projects have been implemented to date. Assess which ones have been most successful and why; and which have not been successful and why. Determine if any analyses have been conducted of these projects in order to improve future projects.
 - c. Review the systems used to track the success/failure of pollution prevention projects.
 - d. Determine whether benefits defined during the project's approval process have been/are being achieved.

B. Integration with Support Activities

In this section, the Assessment Team will evaluate how the organization has integrated pollution prevention within its support functions. An organization committed to pollution prevention will incorporate the underlying concepts in the processes that support its primary operations.

30. Pollution prevention is integrated into the organization's maintenance activities.
 - a. Determine if maintenance personnel have had pollution prevention awareness training.
 - b. Identify the lead individual(s) or group responsible for coordinating pollution prevention activities and assess how they interact with the organization.
 - c. Determine if pollution prevention is considered a part of daily activities.
 - d. Assess whether and to what extent preventive maintenance is an integral part of the pollution prevention program.
 - e. Determine if maintenance activities are reviewed to incorporate pollution prevention opportunities. Determine if there is a mechanism for maintenance to request substitute products. If so, describe the process.
 - f. Determine if maintenance participates in reviews of pollution prevention projects.
 - g. Describe any pollution prevention projects initiated by maintenance or in which maintenance has been a major player.
31. Pollution prevention is integrated into the organization's engineering/design activities.
 - a. Determine if lead engineering and design staff have had pollution prevention training. If so, assess the training to see whether or not it includes Design for the Environment (DfE) and/or life-cycle assessment.
 - b. Identify the lead individual(s) or group responsible for coordinating pollution prevention activities and assess how they interact with the organization.
 - c. Assess to what extent engineering and process design consider pollution prevention concepts in their routine activities. Identify and review any

procedures established pollution prevention design requirements.

- d. Determine if pollution prevention is considered a design criteria. If so, describe any examples and whether it is part of design reviews or is included in value engineering. Review any guidelines established for design reviews.
 - e. Determine if design principles that minimize waste are incorporated into new construction and into options that involve new or modified processes as required by DOE 6430.1A.
 - f. Assess the extent of pollution prevention as an element in past or current engineering and design projects. Describe examples.
32. Pollution prevention is integrated into the organization's construction activities.
- a. Determine if construction personnel have had pollution prevention awareness training.
 - b. Identify the lead individual(s) or group responsible for coordinating pollution prevention activities and assess how they interact with the organization.
 - c. Determine if pollution prevention is a consideration in planning construction activities. Review whether constructability reviews incorporate minimization of wastes during construction.
 - d. Investigate how pollution prevention requirements are conveyed to construction subcontractors and their plans and activities are monitored.
 - e. Assess how construction wastes are managed.
33. Pollution prevention is integrated into the organization's D&D activities.
- a. Determine if D&D personnel have had any pollution prevention training.
 - b. Identify any guidance provided by Headquarters regarding requirements and/or considerations for pollution prevention.
 - c. Identify the lead individual(s) or group responsible for coordinating pollution prevention activities and assess how they interact with the organization.

- d. Determine if pollution prevention opportunities are identified and assessed throughout the entire D&D process from initial facility/area shutdown through final disposition. If so, assess whether this is coordinated between the generator organization and waste management, and if it is included in the transition plan.
 - e. Review how pollution prevention options are identified, evaluated and selected. Assess whether there is a hierarchy of pollution prevention techniques established. If so, describes the techniques and hierarchy.
 - f. Review how costs for wastes and savings from byproducts/recycling are developed for pollution prevention evaluations.
 - g. Identify any D&D projects that have been initiated or completed. Determine how pollution prevention has been a part of these projects.
 - h. Identify any barriers to implementing pollution prevention opportunities in D&D activities.
34. Pollution prevention is integrated into the organization's remediation and restoration activities.
- a. Determine if remediation and restorations personnel have had pollution prevention training.
 - b. Identify the lead individual(s) or group responsible for coordinating pollution prevention activities and assess how they interact with the organization.
 - c. Determine if pollution prevention is a part of overall project development and is integrated throughout or if it is considered separately for each remediation phase.
 - d. Assess how much consideration is given to such techniques as minimizing the amount of soil removed (number and size of bore holes, etc.). Identify the types of pollution prevention techniques that are used for treating contaminated materials.
 - e. Determine if pollution prevention opportunities are coordinated among multiple projects in order to take advantage of economies of scale and minimize cost and waste production.
 - f. Identify any pollution prevention activities associated with remedial actions that have been

implemented. Assess how much waste has been generated and how much waste has been avoided. Review the measurement process.

- g. Assess whether cost savings associated with pollution prevention during remedial actions have been identified. Evaluate how costs for wastes and savings from byproducts/recycling are established for pollution prevention evaluations.
 - h. Review any guidance from Headquarters concerning the importance of and/or techniques for implementing pollution prevention during remediation and restoration activities.
 - i. Assess how pollution prevention options are identified, evaluated, and selected. Determine whether there is a hierarchy of pollution prevention techniques established. If so, describes the techniques and hierarchy.
 - j. Review remediation evaluations to determine if specific pollution prevention R&D efforts have been identified. If so, describe how they are determined and funded. Identify who conducts the R&D.
 - k. Determine if technology transfer is a significant component in pollution prevention options identification. If so, evaluate whether it is within the DOE complex or with industry in general.
 - l. Determine if pollution prevention is affected by regulatory factors (constraints) when developing remediation plans. If so, assess whether these are determined at the outset in EPA reviews.
 - m. Identify any other significant barriers to implementing pollution prevention opportunities.
35. Pollution prevention is integrated into the organization's R&D activities.
- a. Determine if R&D activities are conducted at the site and/or coordinated with other sites at a central facility.
 - b. Determine if R&D personnel have had pollution prevention training.
 - c. Assess how pollution prevention is considered in the R&D process. Review how wastes from R&D are managed.

- d. Determine whether the R&D organization proactively coordinates with operating facilities to identify pollution prevention needs and to establish appropriate R&D programs.
- e. Describe any pollution prevention R&D projects that have been conducted or are underway. Identify and describe any completed R&D activities that have been incorporated into operations.
- f. Assess the process for prioritizing and funding pollution prevention R&D projects. Review whether the process includes cost/benefit analysis.
- g. Determine if there is a process for monitoring the R&D program to ensure that it achieves its plan.

Appendix A

Pollution Prevention-Related Requirements and Documents

Federal

Clean Air Act, 40 CFR Part 82, Protection of Stratospheric Ozone; Refrigerant Recycling; Proposed Rule; Federal Register (FR) 12/10/92

Clean Air Act, 40 CFR Part 63, National Emission Standards for Hazardous Air Pollutants for source Categories; FR 12/29/92

Clean Water Act, Final NPDES General Permits for Storm Water Discharges associated from Construction Sites; Notice; FR 9/9/92

Clean Water Act, Final NPDES General Permits for Storm Water Discharges Associated with Industrial Activity; Notice; FR 9/9/92

Federal Facility Compliance Act, 1/3/92

Pollution Prevention Act of 1990, 11/5/90

Procurement of Environmentally-Sound and Energy-Efficient Products and Services, Policy Letter No. 92-4; FR 11/9/92

Resource Conservation and Recovery Act of 1976, Section 6002 [42 U.S.C. 6962] Federal Procurement

Resource Conservation and Recovery Act of 1976, Section 3002 Standards Applicable to Generators of Hazardous Waste

Emergency Planning and Community Right-To-Know Act (EPCRA), Superfund Amendments and Reauthorization Act of 1986, Section 313, EPCRA, 40 CFR Part 372, Toxic Chemical Release Inventory Reporting Form/Form R; FR 2/16/88

Council on Environmental Quality; National Environmental Policy Act (NEPA); Pollution Prevention; FR 1/29/93

Executive Orders

12088 Federal Compliance with Pollution Control Standards, 10/13/78

12780 Federal Agency Recycling and the Council on Federal Recycling and Procurement Policy, FR 11/4/91

12843 Procurement Requirements and Policies for Federal Agencies for Ozone-Depleting Substances, 4/23/93

12844 Federal use of alternate Fueled Vehicles, 4/23/93

12845 Requiring Agencies to Purchase Energy Efficient Computer Equipment, 4/23/93

12856 Federal Compliance with Right-To-Know Laws and Pollution Prevention Requirements, 8/3/93

12873 Federal Acquisition, Recycling, and Waste Prevention, 10/20/93

State Requirements

As applicable

DOE Orders

Environmental Protection Agency's Pollution Prevention Strategy (1/91) - Analysis of the EPA's Pollution Prevention Strategy; (EH-231), 3,27/91

Memorandum for Principal Secretarial Offices: Actions on the Elimination of Procurement and Technical Requirements that Mandate the Use of Ozone-Depleting Substances at DOE Facilities and Steps to Accelerate the Phaseout of the Substances, 7/29/92

Memorandum on Fiscal Year 1992 Report on Effectiveness of Affirmative Procurement Program, 11/17/92

Memorandum on the Appointment of the Department of Energy Recycling Coordinator (EH-352), 11/13/92

Waste Minimization, DOE Radiological Control Manual, Chapter 4-11, 6/92

Waste Minimization/Pollution Prevention Crosscut Plan, 1994

Waste Minimization Crosscut Plan Implementation, SEN 37-92, 5/13/92

DOE Model Process Waste Assessment Plan

DOE Policy on Waste Minimization and Pollution Prevention, 8/20/92

DOE Order 5400.1, Environmental Program Plans Ch. 3, Sec. 4 (b), 4 (c)

DOE Order 5400.3, Hazardous & Radioactive Mixed Waste Program, Sec. 7 (d) (5)

DOE Order 5700.6C, Quality Assurance

DOE Order 5820.2A, Radioactive Waste Management